

WHAT IS CLAIMED IS:

1. An optical connector device, comprising:
a two-dimensional optical waveguide layer;
a semiconductor laser having a function capable
5 of switching a plurality of different oscillation
modes; and
an optical path converting structure for
converting an optical path of an outgoing light from
the semiconductor laser,
10 wherein the optical path converting structure
is disposed within the two-dimensional optical
waveguide layer such that a radiation angle of the
semiconductor laser changes within the two-
dimensional optical waveguide layer upon switching
15 over the oscillation mode of the semiconductor laser,
and the outgoing light from the semiconductor laser
propagates in the two-dimensional optical waveguide
layer.
- 20 2. An optical connector device according to
claim 1, wherein the semiconductor laser is a
vertical cavity surface-emitting laser formed with a
current constricting layer in a vicinity of an active
layer composing the semiconductor laser.
- 25 3. An optical connector device according to
claim 2, wherein the oscillation mode of the vertical

cavity surface-emitting laser is switched by control
of at least one of a shape of an aperture (current
path) of the current constricting layer and an
injection current amount of the vertical cavity
5 surface-emitting laser.

4. An optical connector device according to
claim 3, wherein the control causes a change in a
radiation angle of a far-field image of the
10 semiconductor laser.

5. An optical and electrical circuit combined
board, comprising the optical connector device
according to claim 1 formed so as to obtain
15 electrical connection with an electrical circuit
board,

wherein a part of or whole signals from the
electrical circuit board are transmitted by optical
circuit as transmission of optical signals using the
20 optical connector device.